



Tsunami debris off the coast of Yamada, Japan.
US Navy Pacific fleet

Japan Tsunami Marine Debris: Information and action

National Tsunami Hazard Mitigation Program

February 9, 2012
San Diego, California

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West Coast Coordinator
NOAA Marine Debris Program

Overview

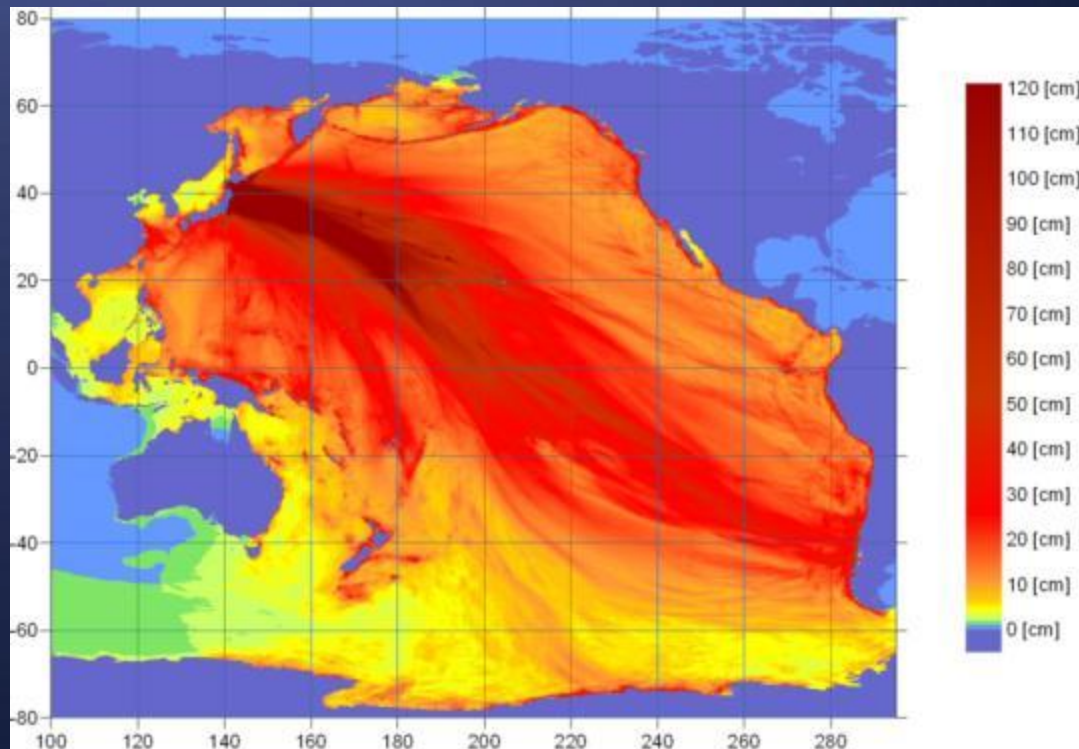
- Background
- Early debris
- Modeling
- Sighting
- Action



Photo: US Navy

Earthquake and Tsunami

- 9.0 magnitude earthquake
- Tsunami wave max height: 130 ft
- 217 square miles inundation
- 15,844 people confirmed dead, 3,451 missing



NOAA's ocean energy distribution forecast map of the 2011 Japan tsunami

The Damage

- The earthquake and tsunami caused severe infrastructure damage
- Total debris estimated at 25 million tons by Japan Ministry of the Environment



Photo: US Navy

Ofunato, March 15

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Early Debris



Photos: US Navy Pacific Fleet

Debris on March 13 off the Sendai coast

- Patches and fields
- Wood, construction materials abundant
- The debris dispersed, some sunk



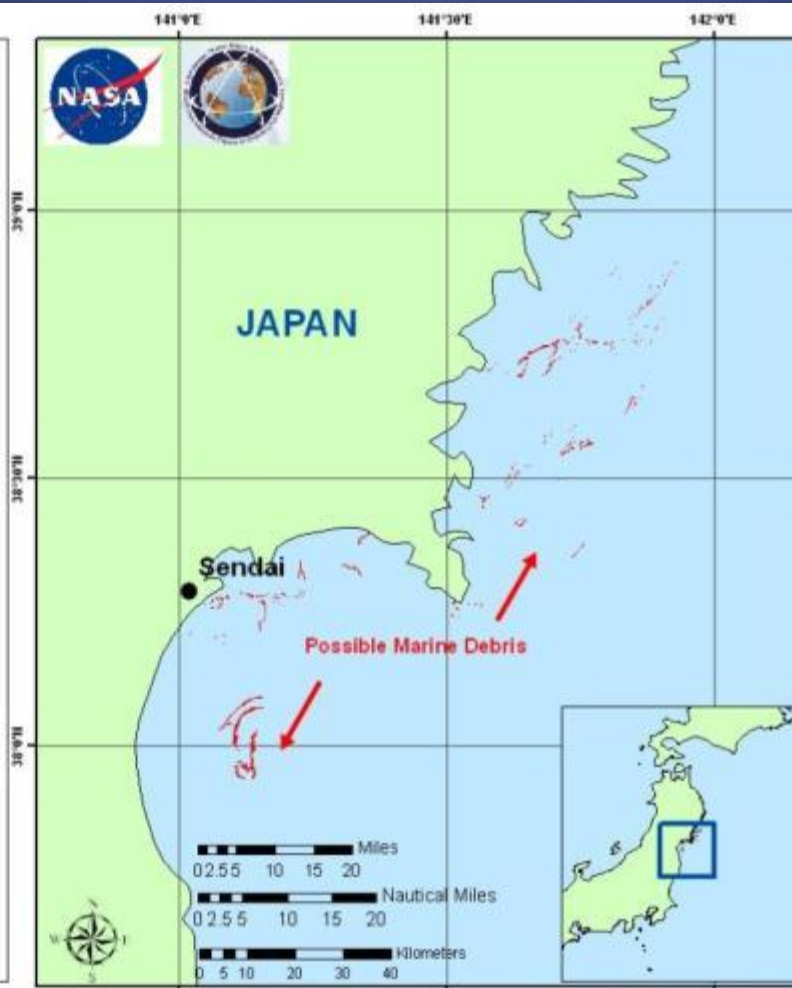
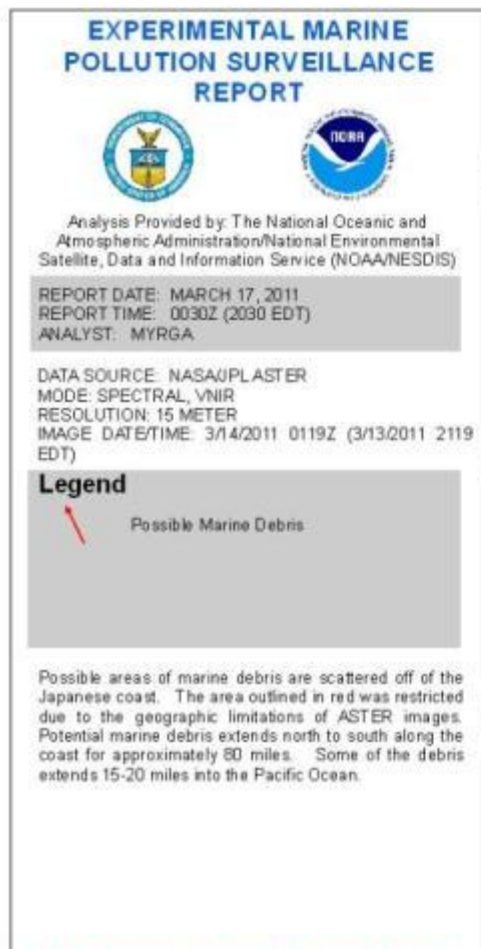
Photos: US Navy Pacific Fleet

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Satellite Detection



By April 14, debris could no longer be detected by satellites.

This is an experimental product of the Satellite Analysis Branch and not operationally maintained. We will do our best to make it available in a timely manner.

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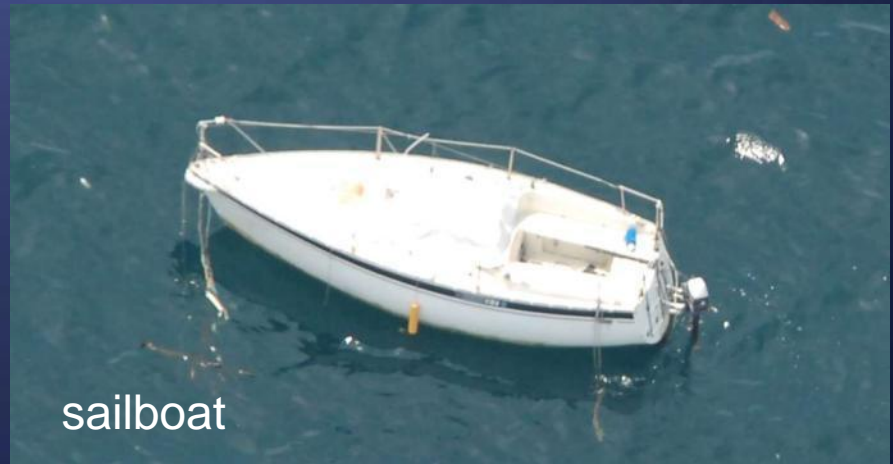
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Floating Debris Items, May 24, 2011



boat



sailboat



container



boom

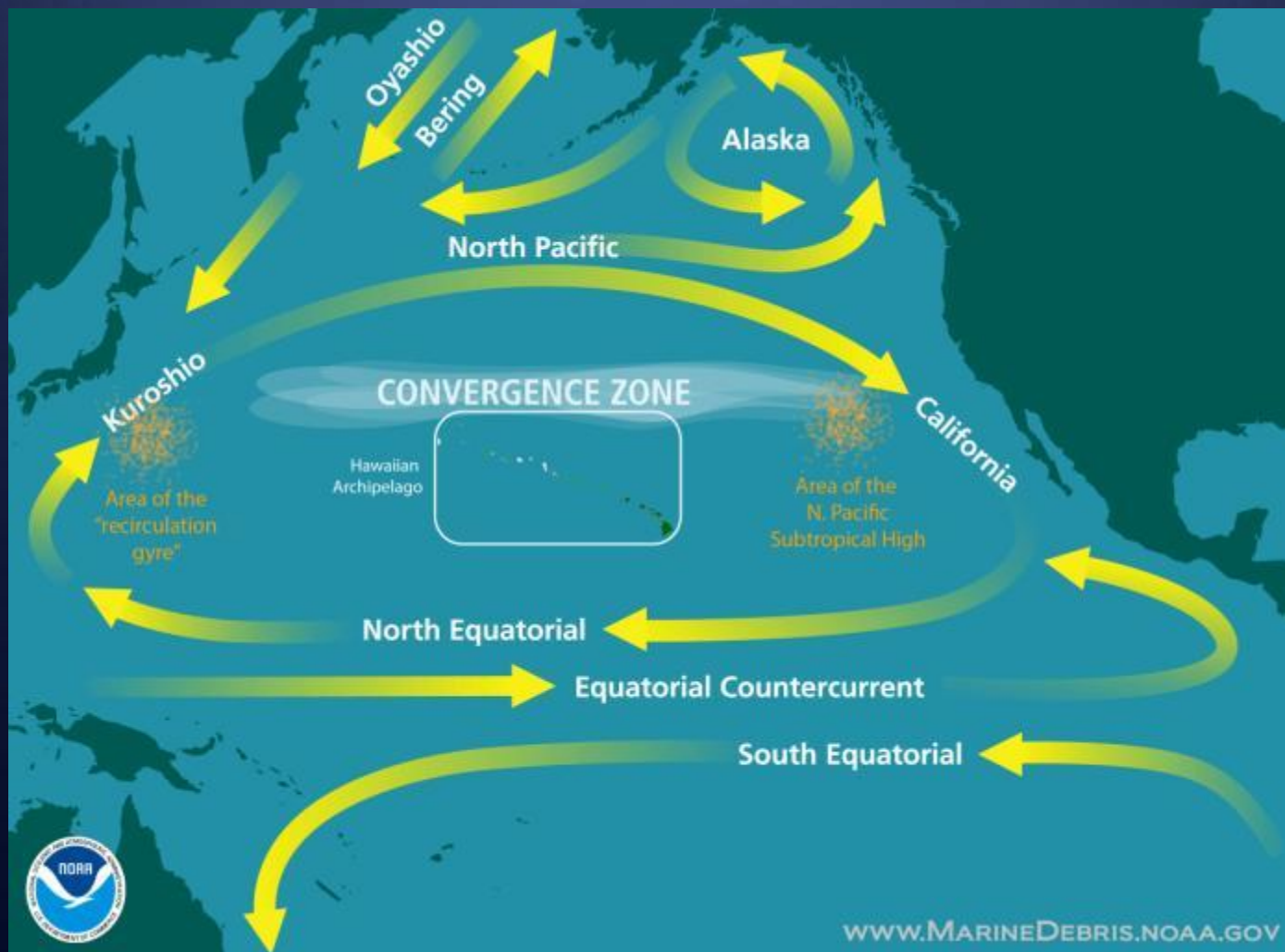
Photos: Japan Air Force

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Marine Debris Movement: Ocean currents and winds



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Trajectories: NOAA OSCURS Model

Degradation?
Winter storms?



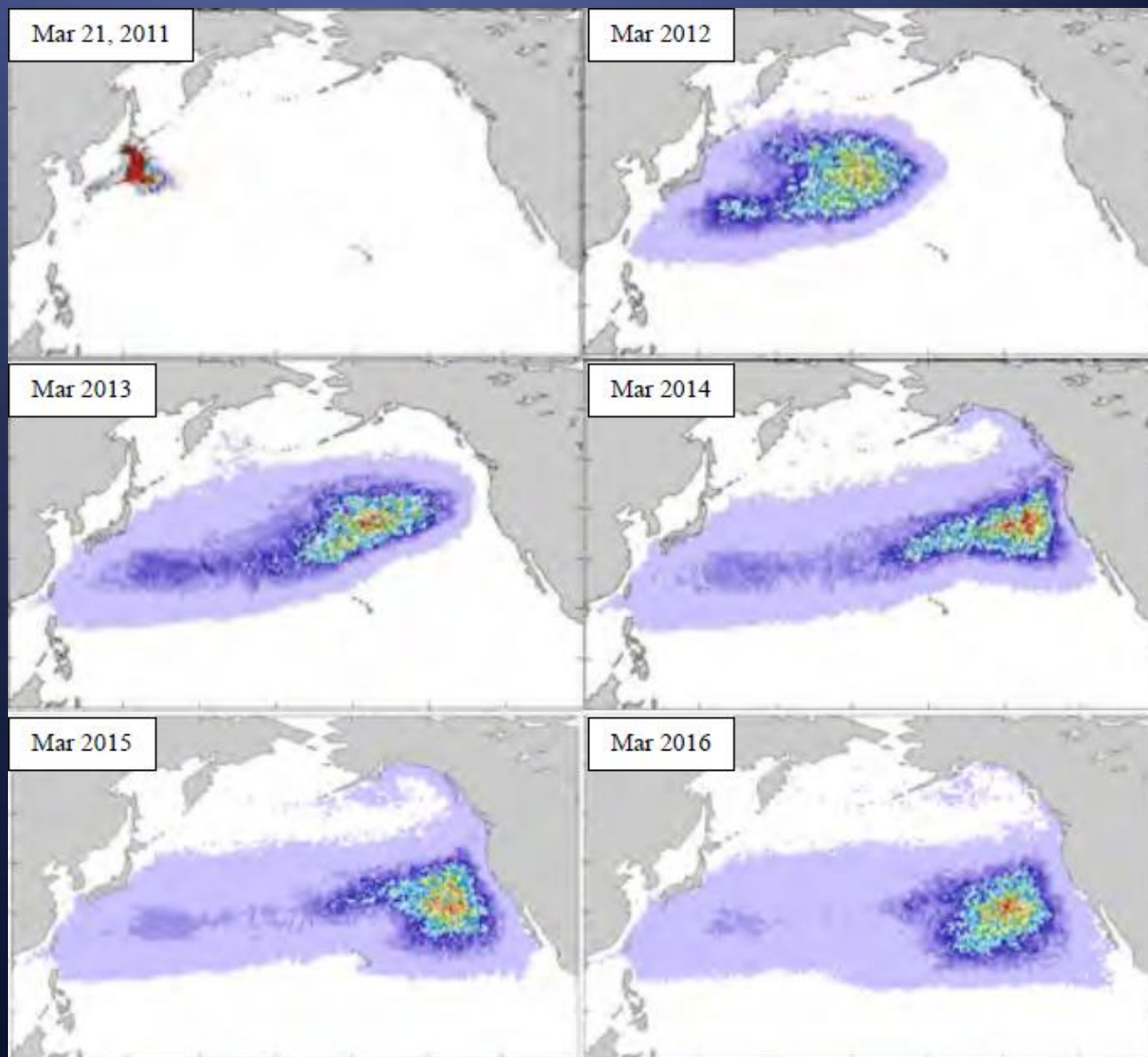
Year 1 = red; Year 2 = orange; Year 3 = yellow; Year 4 = light blue; Year 5 = violet

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University of
Hawaii model
output



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Action so far

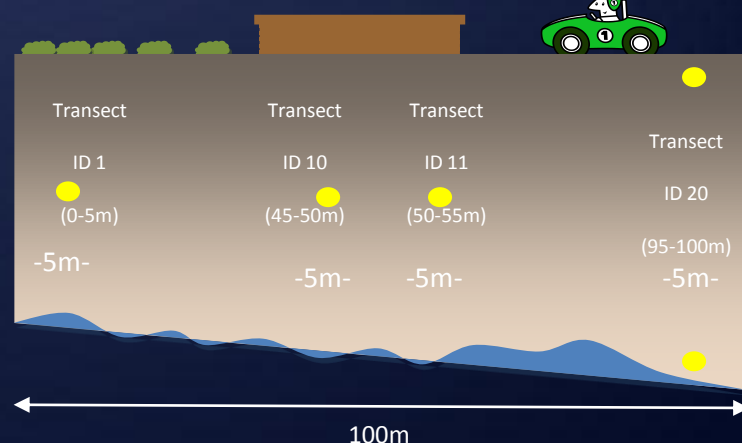
- **Collaboration with partners!**
- Initial assessment
- Information:
 - Website and outreach
 - Public meetings
 - Bulletin with EPA
- Maritime advisory and sightings:
 - NOAA Fleet
 - Merchant marine
 - Fisheries observers
- Satellite detection
- Shoreline survey
- Additional modeling

Report debris sightings to:
disasterdebris@noaa.gov



MDP website FAQs

Back of shoreline



Low tide

Baseline shoreline survey & monitoring

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At-sea Sightings: USCG, Pallada



Photo: USCG

August 1, by USCG vessel



Photo: Pallada

September 21, by the Russian vessel *Pallada*

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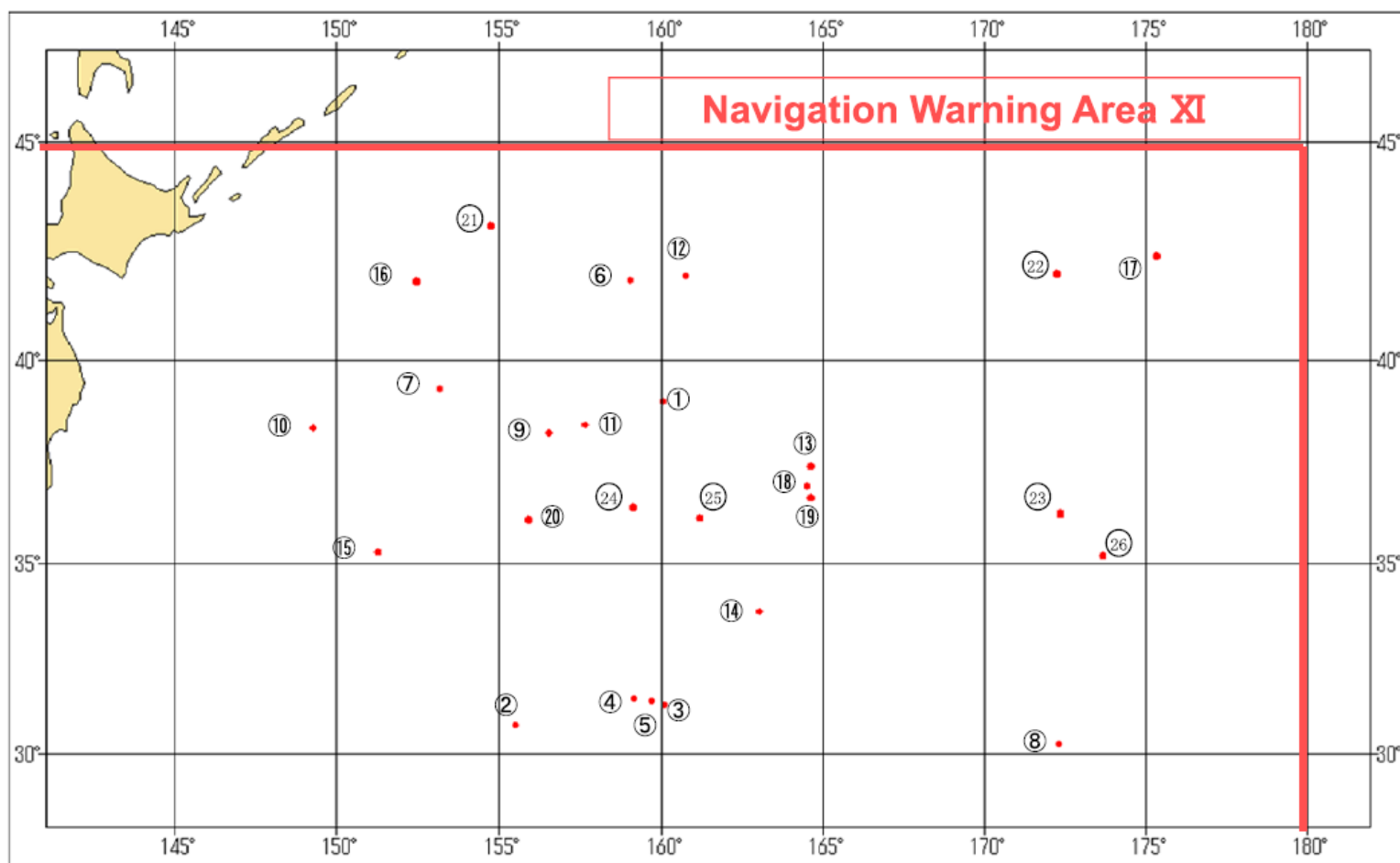
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At-sea Sightings: Japan, July 2011

Marine debris information from NAVAREA XI Navigational Warnings

July 2011



Marine Debris

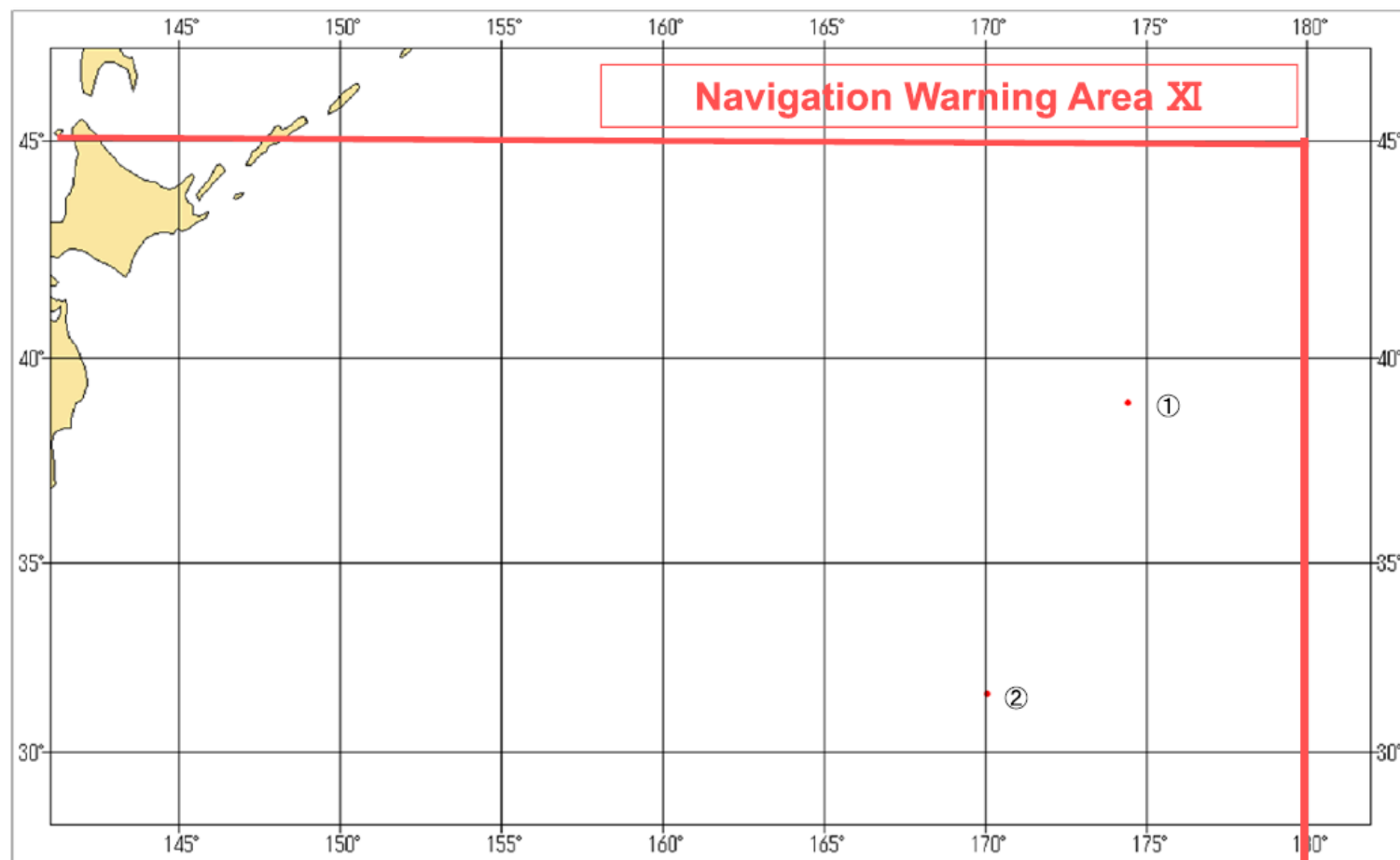
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At-sea Sightings: Japan, November 2011

Marine debris information from NAVAREA XI Navigational Warnings

November 2011



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At-sea Sightings: Japan, Oct., Nov. 2011



Fishing boat



Capsized boat



Gas cylinder



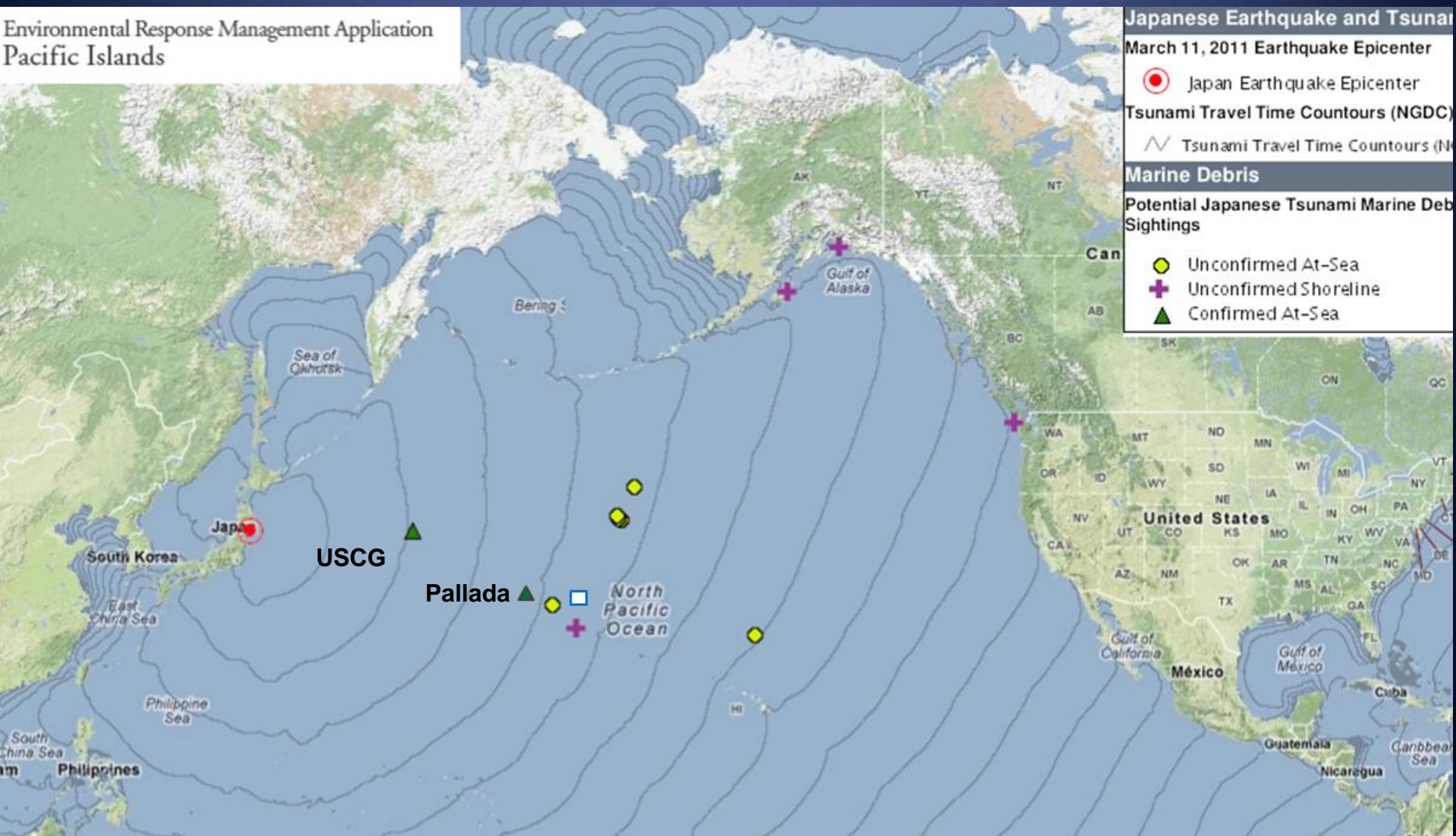
Fishing gear

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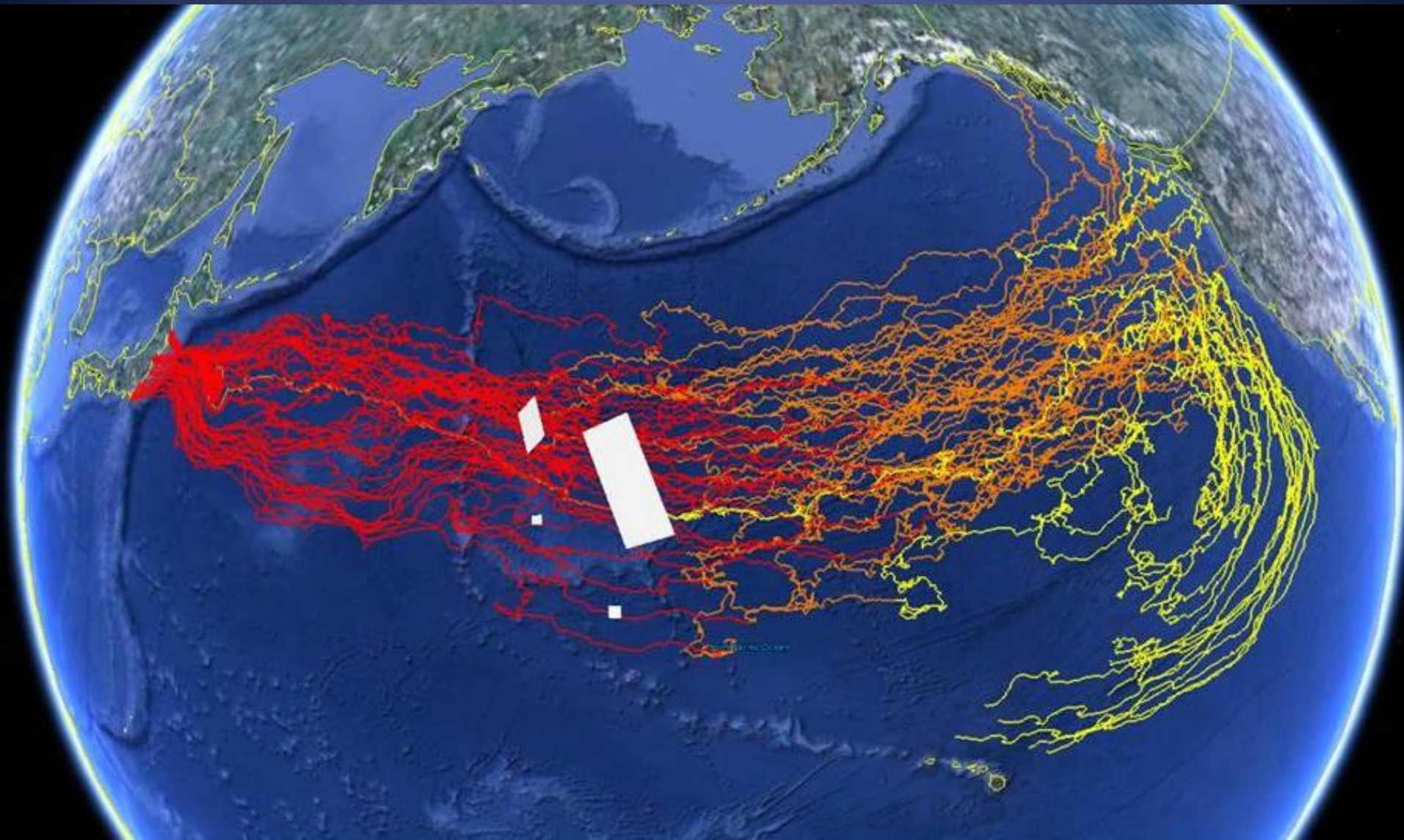
Environmental Response Management Application
Pacific Islands



Tsunami Debris Sightings

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Tsunami Debris Satellite Detection

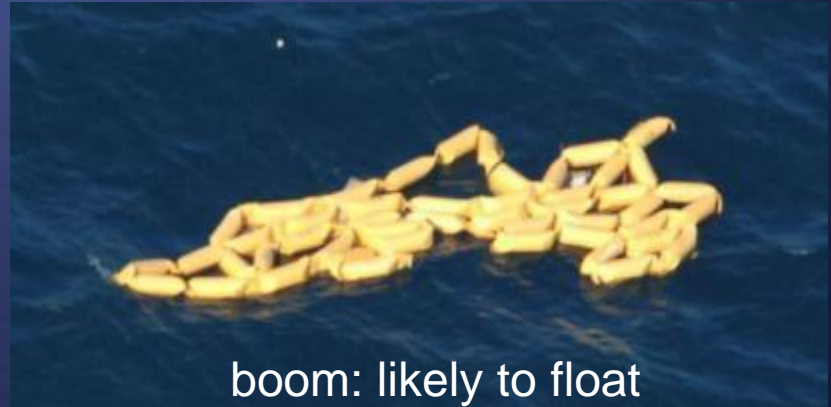


Summary of what we know

- **Debris is dispersed** and not in large concentrations or fields
- **Marine debris sightings:** Some is tsunami-related, some not
- **Computer models' predictions** (all rough estimates)
 - Northwestern Hawaiian Islands: winter 2012
 - West Coast: 2013
 - Circle back to main Hawaiian Islands: 2014 to 2016
 - Models don't predict fate and effect
- **Radioactive? Not likely.**
 - Debris generated over hundreds of miles, while radioactive water leaked from one place
 - Debris washed out to sea before the leak occurred
 - Monitoring results of vessels and debris (Pallada)

Summary of what we don't Know

- How much debris is still out there/still afloat?
- Exact timeline and location
- Fate and effect



boom: likely to float



shipping container: likely to sink

Photos: Japan Air Force

What's next

Japan Tsunami Marine Debris Assessment and Response Framework

- For all US regions of potential impact
- Subject Matter Expert groups – national and regional
- Information & knowledge



Response plans





Thank you

Get info: <http://marinedebris.noaa.gov/info/japanfaq.html>

Report sightings: disasterdebris@noaa.gov

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